

## Nuclear Testing in 1951-1963 and Montana

From 1951-1963, over 90 above-ground nuclear tests were conducted in Nevada. Americans across the country were exposed to varying levels of radioactivity following these tests. Exposure depended on where a person lived, their age at the time of the tests, and the food, especially milk, they consumed.

### Iodine 131

Among the radioactive materials released, the material of most concern was Iodine 131 (I-131). I-131 traveled from Nevada to the rest of the nation on the wind and was eventually deposited on the ground. When cows or goats consumed grass coated with I-131, the I-131 collected in the animals' milk. Drinking this milk passed the I-131 to people, where it collected in the thyroid gland. The half-life of I-131 is eight days, so people were exposed to the highest quantities of radiation during the two months after each test.

The thyroid is a small gland in the throat that regulates metabolism. Exposure to I-131 increases the risk of thyroid cancer and other thyroid disease. The risk of health effects from fallout is greatest in children due to their continuing development, small size, and relatively large milk consumption.

### National Cancer Institute Study

In 1997, the National Cancer Institute released a report estimating local exposure from the Nevada fallout. Dose estimates for exposure to Iodine 131 were calculated for every county in the contiguous United States. The average cumulative thyroid dose from all of the Nevada tests was 2 rads. A rad is the amount of radiation absorbed by the body. The average American receives 0.1 rad per year from naturally occurring radioactivity.

Estimations of individual I-131 doses based on how long a person lived in an affected county and the type and quantity of milk they drank can be calculated using the National Cancer Institute Dose/Risk Calculator available at [www.nci.nih.gov/i131](http://www.nci.nih.gov/i131).

The National Cancer Institute report estimated that Meagher County, Montana, had the highest estimated fallout nationwide with an average dose of 15.8 rad. Fifteen of the twenty-five counties in the U.S. with the highest estimated doses of radiation (over 9.0 rads) were in Montana. Every county in Montana had an average estimated dose above 3 rads.

The 15 Montana counties estimated to have received the most fallout from the Nevada tests in the 1950s and 1960s do not have higher rates of thyroid cancer now compared to other counties in Montana. Looking at data from 1997 to 2001, the rate of thyroid cancer for these 15 counties was similar to the rest of the state.

### Thyroid cancer rates in Montana and the United States, 1997 – 2001

Location	Number of People with Thyroid Cancer	Rate <sup>1</sup> per 100,000 People	95% Confidence Interval
<b>Montana<sup>2</sup></b>	410	9.3	8.2 – 10.2
<b>15 MT counties with highest fallout<sup>3</sup></b>	99	9.0	7.2 – 10.8
<b>41 MT counties with less fallout</b>	311	9.4	8.3 – 10.5
<b>United States<sup>4</sup></b>	13,502	7.3	7.2 – 7.4

<sup>1</sup> Rates age-adjusted to the 2000 US population

<sup>2</sup> Montana data from Montana Central Tumor Registry

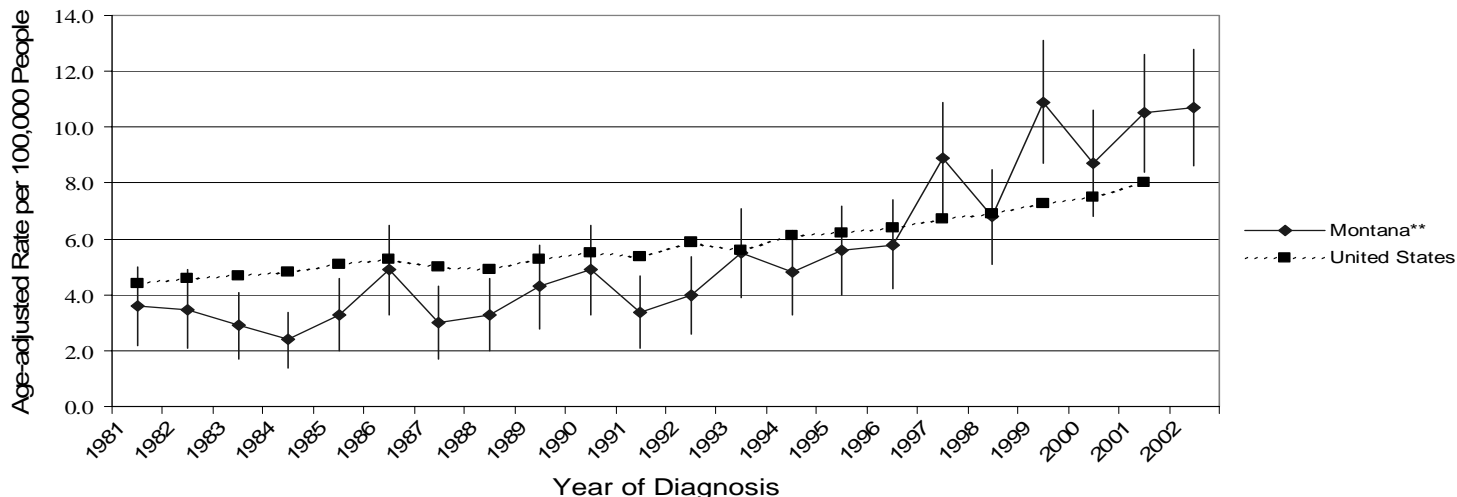
<sup>3</sup> Montana counties with highest estimated fallout (above 9 rads): Beaverhead, Blaine, Broadwater, Chouteau, Deer Lodge, Fergus, Gallatin, Jefferson, Judith Basin, Lewis & Clark, Madison, Meagher, Petroleum, Powell and Silver Bow.

<sup>4</sup> United States rate from the Surveillance, Epidemiology and End Results (SEER) Program, a group of eleven representative cancer registries across the country.

## Thyroid Cancer

In Montana, as with the rest of the nation, the rates of thyroid cancer have increased over the years. For many years, Montana's rate of thyroid cancer was below the national rate, but recently Montana's thyroid cancer rate has been slightly higher than the national rate. In 2001, the most recent year with comparison data, eight out of every 100,000 people in the United States were diagnosed with thyroid cancer while thyroid cancer was diagnosed in 10 out of every 100,000 people in Montana.

**Thyroid Cancer Rates\* in Montana and the United States by Year, 1981-2002**



\*Rates age adjusted to the 2000 US population. Montana data from Montana Central Tumor Registry, US data from SEER.

\*\*Error bars show the 95% confidence interval for the attached rate.

There are other risk factors for thyroid cancer besides exposure to nuclear fallout. X-ray treatments for tonsils and acne exposed children in the 1920s to 1950s to over 100 rads of radiation for multiple visits. Some forms of thyroid cancer are genetic. If a person has altered RET gene, they have a high probability of developing medullary thyroid cancer. This alteration can be detected through a blood test. Not enough iodine in the diet can also increase the risk of thyroid cancer.

The potential of developing thyroid cancer from exposure to I-131 is small, but it is important for Montanans who grew up during the atomic bomb era to be aware of the risks. If you are concerned about your exposure to radiation, talk with your health care provider. Symptoms of thyroid cancer include a lump or tenderness in the neck, difficulty in swallowing, or hoarseness. Thyroid cancer tends to be slow-growing and is usually curable. This type of cancer can be treated and has a high survival rate.

## Radiation Exposure Compensation Act

In 1990 Congress passed the Radiation Exposure Compensation Act to provide money to people who developed cancers and other diseases after exposure to radiation from the Nevada tests. The Act provides medical expense compensation to people who lived in selected Utah, Nevada and Arizona counties. Compensation is distributed by the U.S. Department of Justice. More information is available on their website: <http://www.usdoj.gov/civil/torts/const/reca/>.

## Related Links

The full National Cancer Institute report, [Estimated Exposures and Thyroid Doses Received by the American People from Iodine-131 in Fallout Following Nevada Atmospheric Nuclear Bomb Tests](http://rex.nci.nih.gov/massmedia/Fallout/index.html), can be read at the National Cancer Institute website: <http://rex.nci.nih.gov/massmedia/Fallout/index.html>.

The Hanford Thyroid Disease Study Final Report released by the Centers for Disease Control and Prevention can be found at: <http://www.cdc.gov/nceh/radiation/hanford/>.

A review of thyroid cancer studies is located in the Institute of Medicine Report, [Exposure of the American People to Iodine-131 from Nevada Nuclear-Bomb Tests: Review of the National Cancer Institute Report and Public Health Implications \(1999\)](http://books.nap.edu/books/030906175X/html/index.html), which can be read at <http://books.nap.edu/books/030906175X/html/index.html>.

For more information on the Nevada nuclear tests, radiation dose calculations, or thyroid cancer risk factors, visit the National Cancer Institute website's pages on radioactive I-131 from fallout: <http://www.nci.nih.gov/i131>.

Information on the Radiation Exposure Compensation Act can be found at the U.S. Department of Justice Website available at <http://www.usdoj.gov/civil/torts/const/reca/>.